



ASTI

1989

ANNUAL REPORT

ADVANCED SCIENCE AND TECHNOLOGY INSTITUTE

Department of Science and Technology

Republic of the Philippines
DEPARTMENT OF SCIENCE AND TECHNOLOGY

A S T I

1989 ANNUAL REPORT

Advanced Science and Technology Institute

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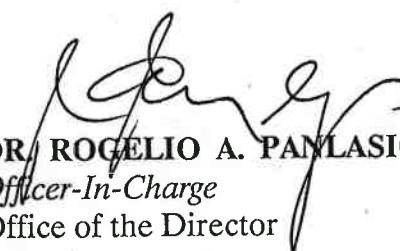
MESSAGE

ASTI's mandate tasked it to do R&D in the fields of information technology (IT), microelectronics, biotechnology and special areas. After deliberate study and substantial consultations, we decided to focus on IT which has been identified as a sector that can contribute greatly towards national development. This will enable ASTI to concentrate the use of its meager resources and obtain optimum results. To a certain extent, biotechnology and general microelectronics are already being addressed by other institutions within and outside DOST.

The choice of IT is a recognition of the vital role of computers and communications in our lives. It has been said that perhaps the single most significant event in the last fifty years has been the emergence of a society whose chief product is information.

This record of the past year, effectively ASTI's existence, is a tribute to ASTI's talented staff who most probably has the lowest average age (at about 26) in any government agency. I would most certainly like to give due recognition to Alfonso L. Aguilar, Jr., who joined ASTI last year as IT R&D Division Chief and actively participated in crafting and nurturing the vision of what ASTI is to become. He has ably provided support to the leadership and management thrusts needed to steer ASTI as it strived to achieve its goals. Lately, we have also formed a steering committee for ASTI composed of: Dr. Efren F. Abaya of the UP College of Engineering, Dr. Alfred Tong of the Ateneo de Manila University and Dr. William Torres of the National Computer Center.

In the years ahead ASTI will be at the forefront of IT R&D in the country, helping other institutions to forge ahead into the coming Information Age. This report is a first-time look at the modest achievements of an institution that we all hope will make a significant contribution to national development.



DR. ROGELIO A. PANLASIGUI
Officer-In-Charge
Office of the Director

INTRODUCTION

Information Technology (IT) is popularly defined as the marriage of computers, software and telecommunications--technologies which have reached their current state of excellence due primarily to the world advances in microelectronics. While IT is fundamentally based on these technologies, it brought along radical changes in cultural and social patterns. IT is not only a technology in the conventional sense, but rather a possible new state of development, a new way of life, cognizance of which is critical for optimal application in a Third-World setting like the Philippines.

Current trends in the world, and even only in ASEAN, point to a pressing need for a cohesive national program for IT. The Philippines must do likewise. This will allow the country to optimize the exploitation of this vital technology to assist in the ongoing national economic recovery effort.

Aware of this development, various leaders in the industry, government and the academe had been aggressive these past few years in coming out with concerted plans and actions to promote IT. Foremost among these is the *National Information Technology Plan (NITP)* implemented by the *Information Technology Coordinating Council (ITCC)* to conceive a "national vision which would provide direction and harmonization of all IT-related activities to assist in nation-building." Supporting the NITP is the *National Telephone Program (NTP)* to provide a key telecommunication infrastructure without which IT cannot be fully harnessed. And then there is, of course, the Report of the *Presidential Task Force on Science and Technology (PTFST)*, currently implemented by the cabinet-level *Science and Technology Coordinating Council (STCC)*, which considered IT as one of the leading sectors for the attainment of the national economic goals.

It is within this context that ASTI aims to pursue its near-term goal as a center of excellence for IT R&D and, hopefully, to provide substantial contribution to the national development effort.

HIGHLIGHTS OF ACCOMPLISHMENTS

The *Advanced Science and Technology Institute (ASTI)* was established as early as 1987, but it started operations in the last few months of 1988. However, it was in 1989 that ASTI expanded its capabilities and developed its infrastructure. This past year has mostly been devoted to organizational development, as well as the acquisition and training of the agency's IT resources.

The Institute had been mandated to conduct research and development work in the following fields, namely: information technology (IT), computer technology, microelectronics and biotechnology. Following deliberate studies, however, ASTI initially focused its limited resources on IT. Besides this main concentration, ASTI also started R&D work on IT-applied Microelectronics as necessary support tools to fully harness the potentials of IT.

ASTI undertook the following in 1989:

A. Institutional Development:

1. Conceptualization and endorsement of its 1990 budget;
- ✓ 2. Coordination with PCASTRD in the formulation of ASTI's research thrusts;

- ✓ 3. Drafting and completion of a 5-year Master Plan for research and development;
- ✓ 4. Infrastructure build-up through:
 - a. Equipment acquisition;
 - b. Personnel recruitment;
 - c. Negotiation for permanent office location;
 - d. Initial renovation for the office and laboratory facilities;
5. Establishment of linkages with local and international organizations for research updates, collaboration and possible sources of funding.

B. External Involvement and Participation:

1. Participated in and aided the *Information Technology Coordinating Council (ITCC)* in support to the National Information Technology Plan;
2. Sponsored and conducted the *DOST Information System Planning Workshop*;
3. Headed the *DOST Information System Planning Committee* and par-

- ticipated in three technical committees for a DOST-wide Information System; and
4. Conducted training on commercial software packages for PCASTRD personnel and other clients and users.

ASTI's initial activities has resulted in the identification of more specific **areas of concern** for R&D activities. These areas are:

1. Local Networks
2. Data Communication
3. Database Management
4. Software Engineering

ASTI has developed a working structure based on the specified areas of concern. The above specialized fields in IT are the main focal points of the **technology acquisition process** which was conceptualized.

The following research and development projects were conducted in 1989 when a sufficient number of research platforms and technical personnel were acquired by the Third Quarter:

1. Study of Information Technology Status (completed)
2. Database for Academic Advancement Opportunities (completed)
3. Payroll System (ongoing)

4. Expert System on Student Advising (ongoing)
5. Cash Management System (ongoing)
6. 201 File System (ongoing)
7. Inventory Management System (ongoing)
8. VHF Prototype Data Communications Link (ongoing)
9. Expert System for Coral Species Identification (ongoing)

The Institute's continuous expertise build-up is being conducted with the goal of becoming the "**SOLUTIONS CENTER**" of the IT industry. As a result of its technology acquisition activities, ASTI can now provide:

1. Consultancy services to solve IT technical problems.
2. Training programs with adequate theoretical foundation and hands-on experience in various software- and hardware-based IT fields.

Other S&T services that ASTI provided to 55 individual users and clients (exceeding the target number of clients) who made use of ASTI's facilities were:

1. Computer Access and Peripheral Equipment Use
2. Library Access

3. Consultancy and Technical Services on Software Use and Hardware Repair
4. Technical Training of Trainors and Users in Computer Interfacing and Commercial Software

Contract research has been conducted for *Graphics, Text and Data (GT & D)*, a local software development firm, on 4th GL-based Business Systems. ASTI was also consulted by the *Department of Health (DOH)* about its LAN and data communication requirements. These contract researches and consultations by both the private and government sectors serve as testimonies and recognition of ASTI's role as a "solutions center" in IT.

Perhaps ASTI's biggest accomplishment for 1989 was its growth from a fledgeling institute with just a handful of staff occupying three borrowed rooms to a full-fledged R&D institution. The first half of the year was preoccupied with policy and budget formulation and the establishment of administrative operations. ASTI then relocated its office from Bicutan to UP Diliman and during the third quarter and in the second half of the year finalized its functions and procedures through the hiring of technical personnel, equipment acquisition, and capability build-up.

Twenty-eight sets of microcomputer systems, assorted peripherals, and various research and utility equipment were purchased, along with various commercial software and technical

publications. The Institute's personnel increased to 33 from six in 1988 with the 18 technical staff composed of several high-quality college graduates. To improve the knowledge and skills of the staff, several were sent to 16 workshops, seminars and training courses.

In pursuit of its goal to develop office automation, some of the Institute's financial and administrative functions and operations were computerized. To meet industry and market needs, the 1989 budget was realigned so as to purchase assorted high-end computers and precision electronics instrumentation instead of a minicomputer. Its working structure was further streamlined and made more flexible in line with its focus on IT and to be able to cope with rapidly changing conditions. All in all, 1989 was a year full of challenges as ASTI evolved from a small working group into a highly capable and promising institution.

POLICIES AND ORGANIZATION

A. MANDATE

The *Advanced Science and Technology Institute (ASTI)* was established within the *Department of Science and Technology (DOST)* under Executive Order 128 on 30 January 1987. ASTI is mandated to contribute to the overall national objectives by:

1. Undertaking long-term researches to strengthen and modernize the science and technology (S&T) infrastructure;
2. Conducting research and development (R&D) work in advanced fields including biotechnology and microelectronics; and
3. Complementing the overall endeavor in the scientific fields with intensive activities in the computer and information technologies.

B. ORGANIZATIONAL STRUCTURE

ASTI was originally envisioned to be an implementing agency working closely and in coordination with the *Philippine Council for Advanced Science and Technology Research and Development (PCASTRD)*. As such, ASTI was established with the following divisions (see Annex 1: *ASTI Organizational Chart*):

1. **Finance and Administrative Division (FAD)** to provide general administrative and support services;
2. **Microelectronics Division (MED)** to conduct R&D in the application of microelectronics, design and manufacture of integrated circuits (ICs) and IC-based electronic systems;
3. **Information Technology Division (ITD)** to conduct R&D work and complement the scientific endeavor in computer and information technologies and build up the facilities for information technology development and other related areas;
4. **Bioengineering Division (BED)** to conduct R&D work in advanced fields of studies which include agricultural, medical, environmental, industrial, and other related areas in bioengineering researches; and
5. **Special Areas Division (SPAD)** to conduct R&D activities on special areas of concern relating to the advanced fields of studies not otherwise covered by the other technical divisions.

After deliberate study and substantial consultation with concerned sectors, the management decided to initially focus on information technology and IT-applied microelectronics.

This will enable ASTI to concentrate its meager resources to obtain optimum results. In the meantime, bioengineering, general microelectronics and special areas are, to some extent, already being addressed by other R&D agencies within and outside DOST.

C. GENERAL CONCERNS

As a major concern in the national economic development program, the impact of IT can be classified into two main objectives:

1. **Promotion of the IT Industry** resulting in the establishment of IT equipment manufacture, software and systems development activities, and IT services; and
2. **Promotion of IT Application** which involves encouraging the creative and strategic exploitation of IT to enhance business competitiveness and social productivity.

ASTI aims to advance the above objectives by providing technological support as a research center with a focus on IT. With IT applications being rich in both market-dictated and knowledge-seeking activities, a good mixture of Applied and Basic R&D is very much realizable. With the foregoing in mind, ASTI coordinated with PCASTRD in the preparation of its own research thrusts. ASTI also completed and implemented a *Research and Development Program* covering the next five years with the vision of producing

substantial outputs in the leading edges of IT.

D. IMPLEMENTATION STRATEGY

As a new organization, ASTI fully realized the weight of a start-up operation. With the vision of the leadership, the dedication of the staff and the initial support of the government, ASTI will be guided by the following philosophies it has adopted as it strives to meet the challenge:

1. Establishment of a good mixture of Applied and Basic R&D activities to maintain a pragmatic level of relevance while seeking new knowledge;
2. Adoption of reverse engineering principles whenever applicable instead of "reinventing the wheel";
3. Encouragement of synergistic activities with local industry, the academe and other government institutions;
4. Intensification of efforts to attract and maintain talent, improve research management and provide a conducive environment for creative activities;
5. Promotion of international linkages to keep abreast with technological advances; and
6. Upholding of the national development interest.

ASTI's strategy for implementing its R&D activities will therefore consider the following:

1. **Target Clientele** including the local industry, the academe, other government agencies, and specific multisectoral efforts such as the proposed S&T park in the UP Diliman campus;
2. **Facilities and Manpower Buildup** by giving top priority to manpower development programs and by constantly upgrading facilities and research platforms.
3. **International Linkages** to keep updated on international developments and to explore possible foreign assistance.

E. LINKAGES AND EXTERNAL INVOLVEMENT

In order to achieve its objectives, ASTI established linkages with several IT-related institutions and became involved in various IT-related activities. ASTI, among others, is a member of the *IT R&D Committee of the Information Technology Coordinating Council*. ASTI is also actively participating in the deliberations of the various Sectoral Technical Panels of the *Science and Technology Coordinating Council*, thereby contributing important technical and policy information.

REBUSTS AND TECHNOLOGY TRANSFERRING SERVICES

4. **Customized Information Systems** capability of both hardware and software implementation geared towards specific functions to fit clients' productivity.
5. **Modelling and Simulation** development, economic and social applications, re-purposing, requalification, and cross-training initiatives.
6. **Parallel Machines** to exploit parallelism which is now implementable with the advances in technology.
7. **Pattern Recognition** in obtaining useful information from oceans of data consisting of images and/or text.
8. **Standardized data communication** through Open Systems Interconnection (OSI) to connect heterogeneous machines.
9. **Full integration** of various forms of information including text, data, graphics, images, speech and video through the concept of integrated services Digital Network (ISDN), and
10. **Local Development** of IT equipment and communication systems to support the local IT industry.

From its first achievements up to the time of IT sector in a very hectic pace, ASTI is continuously improving the institution better for the future.

RESEARCH THRUSTS AND PROPOSED ENGINEERING SERVICES

ASTI conceptualized in its five-year *Master Plan* a number of research thrusts and engineering services.

A. RESEARCH THRUSTS

ASTI's research thrusts were conceptualized to develop local expertise in high-end state-of-the-art hardware and software and for providing technical assistance to interested users. The ASTI research and development program involves the following research thrusts which are also priority leading edges in IT:

1. **Computer-Aided Systems Engineering (CASE) Tools** to enhance the capability of computer professionals in the entire software development process;
2. **Knowledge Systems** using expert system techniques to develop computer applications with expert-like ability to solve complex problems or as part of computer-aided instruction;
3. **Computer-Aided Engineering (CAE)** to exploit high-tech design tools and methodologies in designing world-class products;
4. **Database Design and Services** to provide integrated information for both public and private enterprises;
5. **Customized Information Systems** consisting of both hardware and software implementation geared towards specific functions to increase productivity;
6. **Modelling and Simulation** of scientific, economic and social applications to enhance experimentation and decision-making processes;
7. **Parallel Machines** to exploit parallelism which is now implementable with the advances in technology;
8. **Pattern Recognition** to obtain useful information from oceans of data consisting of image and/or text;
9. Standardized data communication through **Open Systems Interconnect (OSI)** to connect heterogeneous machines;
10. Full integration of various forms of information including text, data, graphics images, speech and video through the concept of **Integrated Services Digital Network (ISDN)**; and
11. **Local Development of IT Equipment and Communications Systems** to support the local IT industry.

From the fact that advancements in the field of IT occur at a very hectic pace, ASTI's initial activities have given the Institute a better focus on the tech-

nical areas which should be prioritized. This has resulted in the identification of more specific **areas of concern** for R&D activities. These areas are:

1. Local Networks

- a. Local Area Network (LAN)
- b. Private Automatic Branch Exchange (PABX)

- c. High-Speed Local Networks

2. Data Communication

- a. Switching
- b. Data Services
- c. Packet Radio,
- d. *Open Systems Interconnect (OSI) Standard*
- e. Data Encryption and Decryption

3. Database Management

- a. Relational Database Management System (RDBMS)
- b. *Structured Query Language (SQL)*

4. Software Engineering

- a. Computer-Aided Software Engineering (CASE)
- b. Prototyping
- c. Object-Oriented Programming

d. Expert Systems

ASTI has developed a working structure based on the specified areas of concern. The above specialized fields in IT are the main focal points of the *technology acquisition process* of ASTI. This process involves:

1. Assimilation of what is currently available in the market.
2. Identification of relevant problems whose solutions can be based on existing technologies.
3. Actual experimentation on available software and hardware to acquire the needed experience and expertise in these areas.

B. ENGINEERING SERVICES

With the acquisition of high-end platforms for R&D work and capable manpower, ASTI can now selectively share its resources with interested sectors. This will facilitate synergistic activities which could very well be mutually beneficial. As part of its five-year master plan, ASTI formulated the following services which will be made available in the future:

1. **Precision Electronics Instrumentation** - A set of tertiary standard instruments will be made available to the academe, small and medium enterprises, and other interested users. These instruments will be

calibrated to internationally-traceable standards.

- 2. Computer-Aided Design (CAD) and Computer-Aided Engineering (CAE)** - Industry and other interested users can avail of the spare availability of the engineering graphics workstations together with the high-end design and software tools on mechanical, electronics and plastic product engineering. ASTI intends to share these platforms in designing and manufacturing world-competitive products for local companies.
- 3. High-End IT Training** - Certain niches in IT needs high-investment facilities which ordinary training institutions cannot afford. ASTI hopes to contribute to the enhancement of local expertise by developing practical training programs geared toward data communications, expert systems, database design, microelectronics and other high-end areas.

THE STAFF OF ACADEMIC OPERATIONS FOR PERSONNEL DEVELOPMENT

Dr. Michael Doherty

Dr. Michael Doherty is almost 30 years old and has a remarkable capability to inform and inspire. Technology and education are his passion. One of the major programmes of the computer development programme is to teach people skills and knowledge to the next generation through our

workshop and research programme. It provides a unique opportunity for a number of local IT companies to gain valuable experience and to develop their own IT products.

THE STAFFING

II. ORGANIZATIONAL STRUCTURE

I. ASTI PAYROLL SYSTEM

Planning Carrollton, Louisiana

ASTI's payroll system processes the computerized pay of all employees monthly. This is split up into two payrolls per year, hence the computation being done by the computer. The system maintains records, such as, salary increments, and "times" the time worked by each month separately. This makes it easier to do the payroll. The ASTI's Human Resource Management System will be used as because of its accuracy and efficiency due to its computer.

Below, the following is our HR software developed by:

a. System Requirements

b. System Description

RESEARCH AND DEVELOPMENT ACTIVITIES

A. COMPLETED PROJECTS

1. STUDY ON THE STATUS OF THE IT INDUSTRY

Proponent:

Teresita C. Rubiales-Alarcon

This study discusses the status and trends of Information Technology (IT) in the Philippines. It also discusses the needs of the local industry as well as the identification of the promising areas of IT. This is in line with one of the major concerns of ASTI, i.e. to promote the IT industry in the Philippines. The information serves as a guide in the planning of programs to be conducted by ASTI in the future.

Status: Completed

2. DATABASE OF ACADEMIC OPPORTUNITIES FOR PERSONNEL DEVELOPMENT

Proponent:

Ma. Josefa I. Doble

This research is aimed to upgrade the personnel's capability in Information Technology and other related fields. One of the major programs of ASTI is manpower development to gain new knowledge, skills and expertise. Due to the meager funds available for

ASTI in this area, a solution is proposed to provide academic opportunities for advancement of ASTI personnel through scholarships, grants and fellowships offered by either local or foreign funding institutions.

Status: Completed

B. ONGOING PROJECTS

1. ASTI PAYROLL SYSTEM

Proponent:

Carmelo H. Lauengco

ASTI's payroll system involves the computerization of an employee's monthly salary staggered into two payroll periods. An automatic transaction is being done by the computer. The system minimizes errors resulting from salary computations, and lessens the time it takes to post payroll transactions. Foxbase+ has been chosen as the software that ASTI's Office Management System will be based on because of its powerful and efficient database features.

Status: The following stages have been accomplished:

- a. System Requirements
- b. Software Requirements

- a. Preliminary Design
- b. Detailed Design
- c. Code and debug (present stage)

Time Frame: 3rd Quarter of 1989 to February 1990

2. EXPERT SYSTEM ON STUDENT ADVISING

Proponent:

Aurelio C. Pimentel

This project aims to produce a computer program that advises students on what subjects to take on a per semester basis. The program will come out with decisions and advice that are correct and are consistent with those that faculty advisers make. This project is meant to ease the burden on faculty members and speed up the student advising and registration processes.

Status: Initial advice submodule is completed. Revising design, coding and debugging of interactive advice submodule is being undertaken.

Time Frame: 3rd Quarter of 1989 to 2nd Quarter of 1990

3. CASH MANAGEMENT SYSTEM

Proponent:

Precy P. Obj-a-an

b. Cash Management is simply monitoring the fund of ASTI. This can be done by monitoring the checks that have been released since ASTI started operation. A system is being developed written in Foxbase + to monitor these checks. In this system, it will be known how many checks have been released and encashed and to whom these checks were issued.

Status: The following stages have been accomplished:

- a. System Requirements
- b. Software requirements
- c. Preliminary design
- d. Detailed design
- e. Code and debug
- f. Test and Preparations
- g. Operations and Maintenance (present stage)

Time Frame: 3rd Quarter 1989 to February 1990

4. 201 FILE SYSTEM

Proponent:

Emma R. Pagador

As part of ASTI's aim to automate its offices, the computerization of its personnel 201 files was proposed. Important personnel data would be stored

in a database in which queries can be performed. To do this, a program implemented in Foxbase+ will be developed. The project aims to minimize the Personnel Officer's excessive paper work and maximize the Personnel Officer's time in performing more important tasks with regard to her handling of the 201 file.

Status: The program is in the process of coding and debugging.

Time Frame: 3rd Quarter 1989 to February 1990

5. INVENTORY MANAGEMENT SYSTEM - Computerized database and ledger system for the inventory of ASTI property and materials.

Proponent:
Carol C. Pimentel

This is a project to design a computerized database and ledger system for ASTI use that will refine and reduce existing manual procedures for the inventory of all ASTI property and materials. This ledger system shall comprise regularly-updated databases on equipment, semi-expendable equipment, expendable supplies, dealer information, and other data as well as data entry forms, report forms, Foxbase+ programs, and database maintenance procedures and instructions. This will allow quicker access, reporting and updating of management information on the procurement and issuance

history and current status of all ASTI property and materials.

Status: Currently in the test and pre-operations stage.

Time Frame: 3rd Quarter 1989 to February 1990

6. VHF PROTOTYPE DATA COMMUNICATIONS LINK

Proponent:
Reinhard E. Jeresano

In order for ASTI to achieve its objectives, efficient and reliable communications systems is necessary. At present, wire communication is not possible with the DOST main office such that radio communication is proposed as an alternative. The VHF prototype communications system will enable ASTI to transmit voice and digital information from UP Diliman to DOST in Bicutan. This project will also lead to future developments to meet the information transfer requirements of ASTI.

Status: System design and specifications are completed; purchase of communications equipment are on hold pending approval of the NTC (*National Telecommunications Commission*) license.

Time Frame: Third Quarter 1989 to First Quarter 1990

7. CORALEX I: An Expert System for Species Identification within Two Scleractinian Coral Genera, *Favia* and *Favites*, of Family Faviidae

Proponent:

Selwyn Clyde M. Alojipan

This project aims to develop a computer-aided tool to help biologists, ecological researchers, resource managers, teachers and students who are not experts on coral taxonomy in the rapid identification of coral specimens. The proposed expert system shall provide a user-friendly taxonomic guide for quick proximate identification of coral specimens belonging to the genera *Favia* and *Favites* (Family Faviidae) which include 20 to 30 Western Indo-Pacific species. This compact project shall test the applicability of expert systems to coral researchers and will provide training and experience on the use of expert systems for both the proponent and the beneficiaries of the project.

Status: Conceptualization and Planning Stage

Time Frame: Third Quarter 1989 to June 1990

Proponents:

Aurelio C. Pimentel
Ernesto T. Tarroza, Jr.
Reynaldo Tiu
Reymundo A. J. Juco
Samuel Molines
Denis Villorente

The development of an *ORACLE*-based Business Management System at the *Makati Medical Center (MMC)* was implemented for *Graphics, Text and Data, Inc. (GT & D)*, a local software development firm. The package included MMC's account receivables and account payables systems which ASTI was expected to provide programming assistance. The project has served as additional training for ASTI personnel in the use of the *ORACLE* RDBMS.

Status: The project was completed in December 1989.

C. CONTRACT RESEARCH AND JOINT RESEARCH PROJECTS

i. ASTI GL MMC BUSINESS SYSTEM PROJECT with *Graphics, Text and Data, Inc. (GT & D)*

SCIENTIFIC AND TECHNOLOGICAL SERVICES

The Institute's continuous expertise build-up is being conducted with the goal of becoming the "SOLUTIONS CENTER" of the IT industry. As a result of technology acquisition, ASTI can now provide:

1. **Consultancy Services** to solve technical problems. Specific examples are:
 - a. *ORACLE*-based System Development
 - b. Packet Radio
 - c. PABX
 - d. Local Area Network
2. **Training Courses** with adequate theoretical foundation and hands-on experience in IT fields. Examples are:
 - a. Introduction to *Structured Query Language (SQL)*
 - b. Relational Database Management
 - c. *SQL*-based System Development
 - d. Computer-Aided Design
 - e. C Programming Language
 - f. *Xenix/Unix* Operating System

g. Data Communications

h. Data Structures

ASTI was also consulted by the *Department of Health (DOH)* about its LAN and packet radio problems. This initial contact has expanded into a full contract research project which will start in 1990. These contract researches and consultations by both the private and government sectors serve as testimonies and recognition of ASTI's role as a "solutions center" in IT.

With its acquisition of both low- and high-end computer equipment, general purpose and specialized software, and library materials, ASTI was able to provide various services to several interested users. Even in just a few weeks and months of facilities build-up, ASTI provided the following services to the corresponding number of users and exceeded its target by 90 users/clients:

1. **Computer Access And Peripheral Equipment Use** = 30 users
2. **Library Access** = 48 users
3. **Consultancy and Technical Services:**
 - a. Programs and Software Use = 12 users
 - b. Hardware Repair = 2 users

i. Technical Training in Computer Interfacing and Commercial Computer Software (*WordPerfect*, *Lotus 123*, *Foxbase +*, and *PC Storyboard Plus*):

- a. Training of Trainors = 29 individuals
- b. Training of Users/Participants = 34 individuals

A. TOTAL USERS AND CLIENTS SERVED = 155 individuals

B. TARGETED NUMBER OF USERS AND CLIENTS = 65 individuals

During 1989, ASTI provided computer training services to individuals involved in the following areas:
a. **Computer Applications:** ASTI provided computer applications training to individuals involved in the following areas:
- Business applications (WordPerfect, Lotus 123, Foxbase +, PC Storyboard Plus, etc.)
- Statistical packages (SPSS, SAS, Minitab, SPSS, etc.)
- Database management systems (DB2, Oracle, Sybase, etc.)
- Graphics (PCL, Postscript, etc.)
- General business applications (ASCI, ASCII, etc.)
- Financial time series analysis
- Supervision (PDS, etc.)
- Project management (CPM, etc.)

C. Library Services:

The following library services were provided in 1989 through the following activities:
- Reference services (including general reference, specialized reference, and technical reference)
- Periodicals (including newspapers, magazines, and journals)

CAPABILITY AND FACILITIES BUILD-UP

A. OFFICE TRANSFER AND RENOVATION

At the start of the year, ASTI still held office at the second floor of the TAPI Building in the Bicutan DOST Compound. However, in order to acquire larger office space and at the same time situate itself near the centers of academic research, ASTI negotiated to occupy most of the fourth floor of the UP National Engineering Center in the UP Diliman Campus. While renovation of the unoccupied rooms was going on, a gradual transfer of ASTI personnel was conducted. The final transfer to the new site was completed in July.

B. R&D INFRASTRUCTURE DEVELOPMENT

Research facilities consisting of computer and electronic hardware, software and library materials were acquired to build up ASTI's research capability. This was also in preparation for the various research and service projects to be implemented in 1990.

1. Hardware

Equipment acquisition was initiated in 1988 but it was in 1989 that ASTI developed into a working research institution through the purchase of computer systems and other miscellaneous support equipment. Twenty-eight sets

of computers ranging from ordinary PC-compatibles to high-end 286 and 386 microcomputers were first specified, evaluated, and then installed. Precision electronic instrumentation test and evaluation equipment and data communication systems were also acquired.

2. Software

To complement the above hardware platforms, a set of high-end software development tools were acquired. The major set of software acquired consisted of various *ORACLE* Relational Database Management System (RDBMS) products based on the *Structured Query Language (SQL)*, a fourth generation programming language (4th GL). Other software products acquired were for Local Area Networks (LAN), Computer-Aided Software Engineering (CASE), a Graphics User Interface (GUI), a Real-Time Development Software (RTDS) language and some graphics drawing software.

3. Library Acquisitions

In order to help the staff keep abreast of both local and international advances and developments in IT and computers, ASTI set up a small specialized library. The library's acquisitions focuses on technical publications about scientific research, computers, electronics, communications, engineering, programming languages and other

areas of information technology, especially those which are not available in nearby libraries. More than 150 software manuals and reference books, including a large set of IEEE publications, have so far been acquired since July along with regular issues of 20 specialized journals and magazines.

C. PERSONNEL RECRUITMENT

ASTI started the year with only six personnel but this increased to around thirty by the third quarter. The office transfer in July coincided with the influx of newly hired technical and non-technical staff so that ASTI was able to maintain regular start-up operations parallel to the acquisition of equipment and without much disruption. At the end of the year, ASTI had 33 personnel divided into 18 technical staff (55%) and 15 administrative staff (45%). ASTI encountered great difficulty in recruiting enough personnel to fill up its staff complement, primarily because of the desire to hire only high-quality technical personnel the majority of whom are former DOST Undergraduate scholars and graduates of Philippine Science High School and UP. (Please refer to Annex 2: *Annual Report on Manpower Acquisition for the Year 1989*.)

D. HUMAN RESOURCES DEVELOPMENT

Several of the ASTI staff attended seminars, workshops and training programs to enhance their skills and enable them to keep abreast of developments in their various fields of interest. *Annex 3 (Annual Manpower Development Program of ASTI for the year 1989)* shows the list of 16 workshops, seminars and training courses attended by the ASTI staff.

E. OFFICE AUTOMATION

ASTI was fortunate in that its start-up process coincided with a gradual systemization of its office procedures through computerization. The main goal is to automate general office procedures and functions to reduce data processing and access time and to enable fewer staff to handle more information. As such, the development of automated and computerized procedures is also integrated into ASTI's research projects and staff training program.

The administrative functions and procedures which have been fully or partially computerized with the help of the technical staff are:

1. Various Accounting Entries, Forms and Reports
2. Monitoring of Financial Obligations and Checks Issued
3. Payroll Preparation

4. Property Procurement and Inventory, including Vendors

While the goal does not necessarily mean creating a totally paperless office, it will mean the integration of various new information handling equipment and software into all office procedures. It will also entail a flexible office working structure that can be easily adjusted to evolving conditions.

FINANCIAL STATEMENTS

The total ASTI budget for 1989 was **P13,432,900.00** (Please refer to *Annex 4: 1989 Budget Allotments vs Expenses*). Of this amount, **P3,476,900.00** (25.8%) was for *Personnel Services (PS)*, **P1,262,000.00** (9.4%) was for *Maintenance and Operating Services (MOE)*, and **P9,714,000.00** (64.8%) was for *Capital Outlay (CO)*.

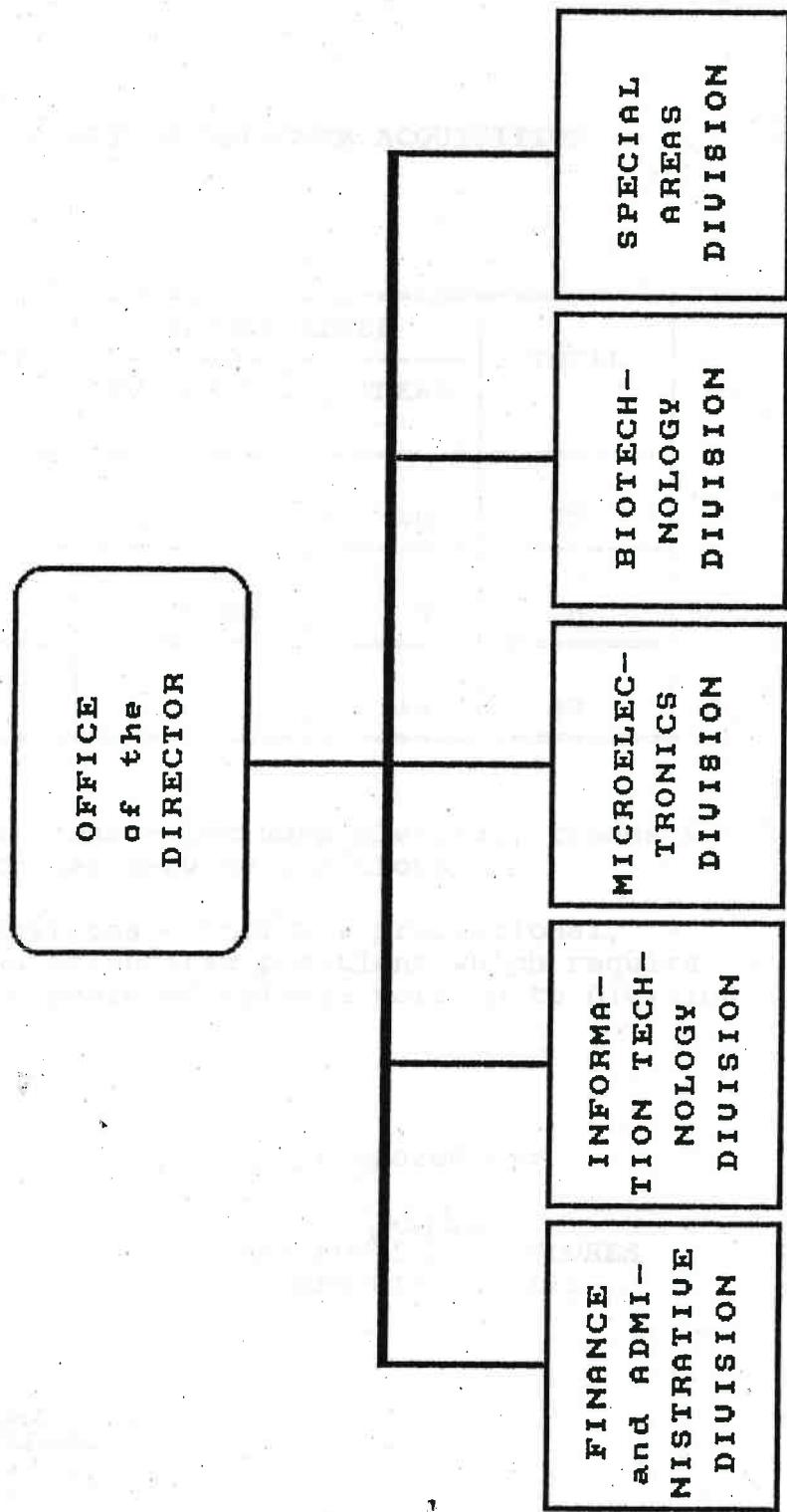
(Please refer to *Annex 5: Breakdown of 1989 Budget According to Activity* to examine the budget allocations for both the administrative and technical areas. Note: Capital Outlay is not subdivided into administrative or technical areas.)

A total of **P1,185,894.28** or 94% of the MOE budget was expended. For PS, due to the lack of qualified applicants for many technical positions, only **P936,516.02** or 27% of the amount was expended. The CO budget included the purchase of a minicomputer but in order to focus more on the pressing market and industry needs and coupled with the recent advances in computer hardware and software capabilities, a Sun graphic workstation was purchased instead. Furthermore, precision electronic instrumentation, data communication and test equipment and CASE software will be among those that will be acquired utilizing the realigned budget for a microcomputer. So although only **P4,673,374.44** or 29% of the CO amount was consumed in 1989, it is expected that the purchase of the above equipment will be completed by the middle of 1990.

Annex 1:

ADVANCED SCIENCE AND TECHNOLOGY INSTITUTE

Organizational Chart



Annex 2:

1989 ANNUAL REPORT ON MANPOWER ACQUISITION

| | FIRST LEVEL | SECOND LEVEL | | TOTAL |
|-----------|----------------|--------------|--------|-------|
| | | DIV. CHIEF | OTHERS | |
| Permanent | 6 | 3 | 16 | 25 |
| Temporary | 3 | none | 5 | 8 |
| TOTAL | 9 | 3 | 16 | 33 |

- * First Level Positions - includes clerical, trades & crafts, custodial service positions.
- * Second Level Positions - includes professional, technical and scientific positions which require at least four years of college work up to Division Chief level.

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HRM Officer III

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Administrative Officer V

Annex 3: ANNUAL MANPOWER DEVELOPMENT PROGRAM OF ASTI FOR THE YEAR 1989

WORKSHOPS/TRAININGS/SEMINARS ATTENDED BY ASTI STAFF

| DATE | TITLE | PARTICIPANT |
|-----------------|---|--|
| May 16-17 | Symposium-Convention on Productivity Through Effective Records and Information Management | Mildred F. Cabradilla |
| May 16-18 | Leave Administration Course for Effectiveness (LACE) | Fatima P. Magtibay |
| May 22-24 | Training on Appointments Preparation (TAP) | May Lucille C. Flores |
| May 25 | AGAP Dialogue-Seminar | Antoinette C. Quintos Danilo R. Hapin |
| June 14 | Training on Pascal Programming | Marlon Raul Z. Tecson Selwyn Clyde M. Alojipan Ma. Josefa I. Doble Precy P. Obja-an |
| July 11 | Forum on the S & T Development Plan | Aurelio C. Pimentel |
| July 18-19 | Fourth Seminar Workshop on Grievance Handling in the Public Sector | Ma. Josefa I. Doble |
| July 20-21 | Netware Systems Manager | Reinhard E. Jeresano |
| September 18-19 | Seminar on Data Communication, TCP/IP Xenix Systems, and Applications Software | Denis F. Villorente Samuel A. Molines |
| September 20 | Hardware and Software Update | Alfonso L. Aguilar, Jr. Marlon Raul Z. Tecson Aurelio C. Pimentel Reynaldo Tiu |
| October 19-21 | Seminar Workshop on Micro CDS/ISIS for Beginners | Mildred F. Cabradilla |
| October 26 | Oracle Database Management Seminar | Reynaldo Tiu Antonio Ernesto R. Tarroza,Jr. |

Annex 3 (Continuation):

| DATE | TITLE | PARTICIPANT |
|--------------------------------|---|--|
| November 6-8 | Short Course on Computer Interfacing | Samuel A. Molines Denis F. Villorente |
| November 21 | Symposium on Internetworking and Prototyping Technology | Samuel A. Molines Denis F. Villorente |
| December 4-8 | Project Management Program (PMP) Seminar | Ma. Josefa I. Doble |
| December 18-20 | DLSU Computer Conference | Peter Antonio B. Banzon |
| XXXXXXXXXXXXXXXXXXXXXXXXXXXXXX | | |

Prepared by:

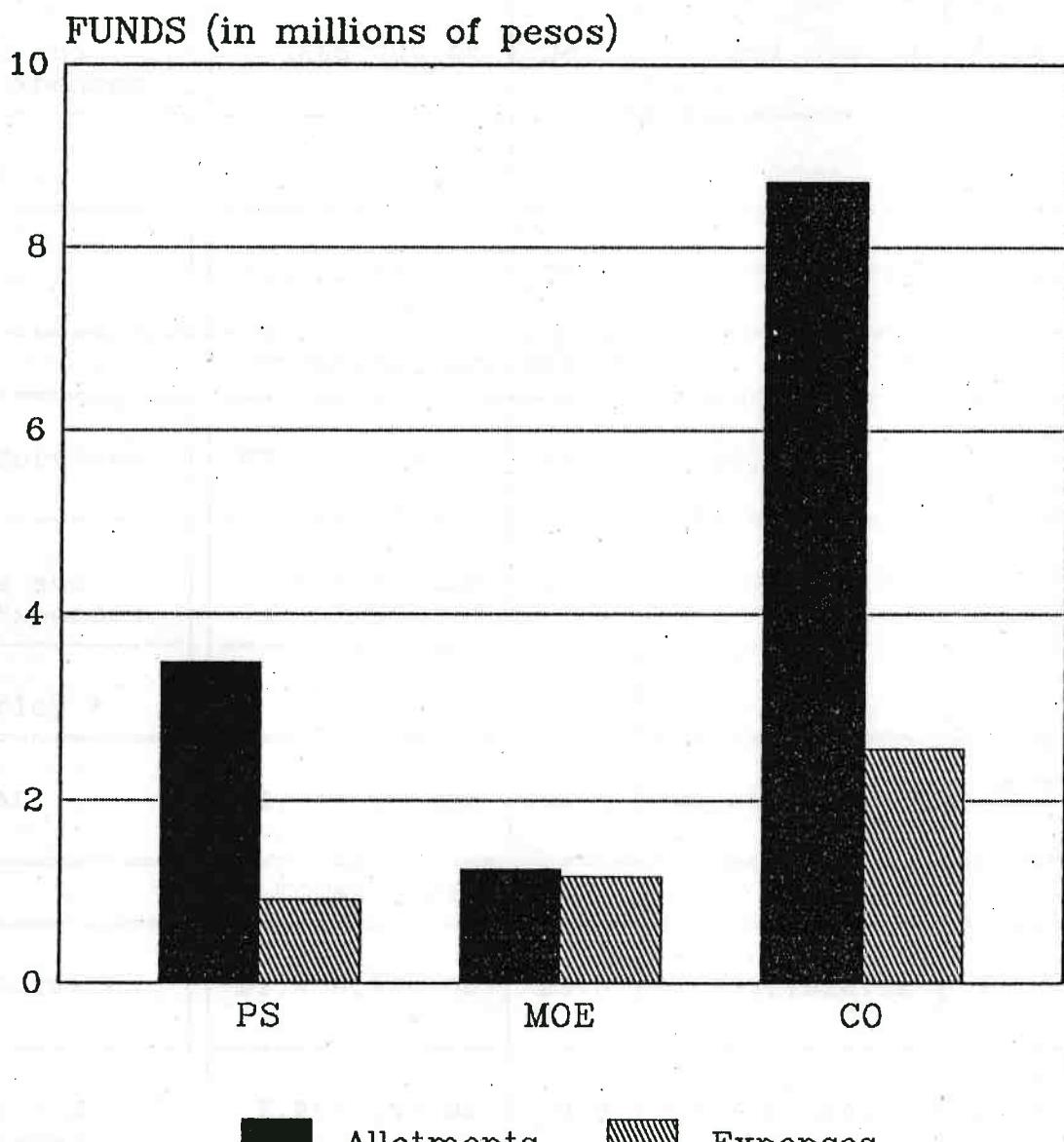
MAY LUCILLE C. FLORES
MAY LUCILLE C. FLORES
HRM Officer III

Noted by:
Carmencita M. Echano
 CARMENCITA M. ECHANO
 Chief, FAD

1989 BUDGET ALLOTMENTS vs EXPENSES

Total Allotments = P13,452,900.00

Total Expenditures = P 4,673,374.44



PS = Personnel Services

MOE = Maintenance and Operating Expenses

CO = Capital Outlay

Annex 5: BREAKDOWN OF 1989 BUDGET ACCORDING TO ACTIVITY

| CATEGORY | ALLOTMENT | % | EXPENDITURES | % |
|------------------------------------|----------------|-------|---------------|-------|
| ADMINISTRATIVE ACTIVITIES | | | | |
| Personnel Services | P1,156,987.00 | 63.5 | P296,524.28 | 33.4 |
| Maintenance and Operating Expenses | 665,000.00 | 36.5 | 591,736.20 | 66.6 |
| Capital Outlay * | | | | |
| TOTAL | P1,821,987.00 | 100.0 | P888,260.48 | 100.0 |
| TECHNICAL ACTIVITIES | | | | |
| Personnel Services | P2,319,913.00 | 79.5 | P639,991.74 | 51.9 |
| Maintenance and Operating Expenses | 597,000.00 | 20.5 | 594,158.08 | 48.1 |
| Capital Outlay * | | | | |
| TOTAL | P2,916,913.00 | 100.0 | P1,234,149.82 | 100.0 |
| TOTAL ASTI BUDGET | | | | |
| Personnel Services | P3,476,900.00 | 25.8 | P936,516.02 | 20.0 |
| Maintenance and Operating Expenses | 1,262,000.00 | 9.4 | 1,185,894.28 | 25.4 |
| Capital Outlay * | P8,714,000.00 | 64.8 | P2,550,964.14 | 54.6 |
| TOTAL | P13,452,900.00 | 100.0 | P4,673,374.44 | 100.0 |

* CO amount is not subdivided into technical and administrative areas.

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